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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/520,109  
Filing Date: January 03, 2005  
Appellant(s): BREUER ET AL.

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Ronald E. Greigg  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/19/07 appealing from the Office action mailed 5/21/07.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct. In view of arguments in Appeal Brief filed on 11/19/07, claims 24-29, 40 are now indicated as objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**(4) Status of Amendments After Final**

No amendment has been filed subsequent to the final rejection.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,938,409	BIRCKIGT ET AL.	09-2005
6,321,531	CAREN ET AL.	11-2001

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claims 20-22, 31-39, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birckigt et al. (WO 02/42615) (see equivalence US Patent 6,938,409) in view of Caren et al. (US Patent 6,321,531).***

Regarding claims 20, 21, 39, Birckigt discloses a method for purifying the exhaust gas stream in the exhaust gas line of an internal combustion engine, of particles such as soot, the exhaust gas stream being enriched with electric gas discharge, the method comprising the steps

of effecting a continuous enrichment of the exhaust gas stream with electric gas discharge such that particles that are present are to a great extent oxidized even during the flow through the exhaust gas line, measuring at least one of the temperature of the exhaust gas and the particle content of the exhaust gas downstream of the enriching, and controlling the concentration of the electric gas discharge essentially as a function of at least one of the temperature and the particle content of the exhaust gas, such that the remaining particle content of the exhaust gas stream does not exceed a predetermined limit value (see col. 4, lines 50-67); however, fails to disclose that ozone is used instead of electric gas discharge. Caren teaches that ozone is generated in a reaction chamber (23) outside the exhaust gas stream and is supplied to the exhaust gas (see Figure 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teaching of Caren in the Birckigt apparatus, since the use thereof would have provided a highly reactive gas species ozone necessary to purify harmful emissions in an exhaust gas stream.

Regarding claim 22, Caren further teaches that ozone is generated in a reaction chamber (23) outside the exhaust gas stream and is supplied to the exhaust gas (see Figure 2).

Regarding claim 36, Caren further teaches that the internal combustion engine is a diesel engine and the rinsing with the gas enriched with ozone is effected during preglow phase of the diesel engine (i.e. before the engine is started) (see col. 15, lines 28-34).

Regarding claim 31, Caren further teaches that the gas stream is introduced into the exhaust gas line upstream of an oxidizing catalytic converter (13) whereby at least the oxidizing

catalytic converter is rinsed with the ozone- enriched gas before the engine is started (see col. 15, lines 42-49, col. 16, lines 5-13).

Regarding claim 32, Caren further teaches that controlling the combustion in the engine immediately after the engine is started, such that the exhaust gases still contain combustible hydrocarbons (see col. 22, lines 4-8).

Regarding claims 33-35, Caren further teaches that effecting an enrichment, in particular a degressive enrichment, of the exhaust gas stream with ozone generated by the ozone source until the operating temperature of the oxidizing catalytic converter is reached (see col. 15, lines 18-24, 28-49).

Regarding claims 36-38, Caren further teaches that the internal combustion engine is a diesel engine and the rinsing with the gas enriched with ozone is effected during preglow phase of the diesel engine (i.e. before the engine is started) (see col. 15, lines 28-34).

Regarding claim 41, Caren further discloses a gas stream enriched with ozone is generated in an ozone source, and rinsing the exhaust gas line at least partially with the gas enriched with ozone before the engine is started (see col. 15, lines 28-34).

***Claims 24-29, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Birckigt et al. (WO 02/42615) (see equivalence US Patent 6,938,409) in view of Caren et al. (US Patent 6,321,531) as applied to claim 20 above, and further in view of Rohde et al. (US Patent 3,771,921).***

Regarding claim 40, the modified Birckigt method discloses all the claimed limitations as discussed in claim 20 above, however, fails to disclose introducing the ozone into the exhaust gas line in the region of the particulate filter so that the particle

filter can be regenerated after the engine has been shut off. Rohde teaches introducing the ozone into the exhaust gas line in the region of a catalytic converter after engine has been shut off (see col. 5, lines 36-51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the teaching of Rohde in the modified Birckigt method, since the use thereof would have been conventional in the art to improve the efficiency of the emission control system.

Regarding claim 24, Birckigt further discloses increasing the ozone concentration on or in the particle filter until the self-ignition of the deposited particles (see col. 4, lines 50-60).

Regarding claims 25, 26, Caren further teaches using a blower to generate an ozone-enriched gas flow through the catalyst device (see col. 22, lines 4-12).

Regarding claims 27-29, Birckigt further discloses regulating the ozone delivery on the basis of the temperature of the particle filter (see col. 4, lines 50-60).

#### **(10) Response to Argument**

**ISSUE 1:** *Appellants assert that neither Birckigt nor Caren teaches or suggests a method including the step of controlling the concentration of ozone in an exhaust gas stream as a function of at least one of the temperature and the particle content of the exhaust gas.*

The examiner respectfully disagrees. Based on appellants' specification, "Various reaction chambers 16 or forms of ozone generation are conceivable. The ozone generation

**can be done in a known manner by plasma generation, UV irradiation, or electrochemically**

(emphasis added by examiner) (see specification, page 9, paragraph [34], lines 2-4).

Birckigt discloses controlling plasma power generation in the exhaust gas as a function of at least one of the temperature and the particle content of the exhaust gas (see col. 4, lines 49-55). Since Birckigt discloses the same means of generating ozone as defined in the specification of the pending application (i.e ozone generation can be done by a plasma generation) and electric discharge in a plasma power generation by Birckigt splits molecules in exhaust gas including oxygen to produce ozone, it is obvious that Birckigt produces too produces ozone. Moreover, as indicated on lines 33-48 of column 6, lines 63-67 of column 8, and lines 46-52 of column 11, Caren shows that the electric discharge device is adapted to produce ozone (O<sub>3</sub>). Therefore, it would have been obvious for one having ordinary skill in the art to utilize a plasma generator for controlling the concentration of ozone in an exhaust gas stream as a function of at least one of the temperature and the particle content of the exhaust gas.

***(11) Related Proceeding(s) Appendix***

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.



Respectfully submitted,

/Diem Tran/  
Patent Examiner

DT  
March 11, 2008

Conferees

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Thomas Denion

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